

What is claimed is:

1. A non-contact temperature measuring apparatus,
comprising:

spherical semiconductors mounted to a measurement
5 object and each having a surface thereof integratedly formed
with an electronic circuit and mounted with a coil; and

a data collector, disposed out of contact with said
spherical semiconductors, for supplying said spherical
semiconductors with electric power required to operate said
10 electronic circuits and for collecting pieces of temperature
information transmitted from said spherical semiconductors,

wherein said electronic circuit of each of the
spherical semiconductors is provided with a memory for
storing identification information proper to the spherical
semiconductor; a power source section for generating internal
power, required to operate said electronic circuit, from
electromagnetic energy received through said coil from
outside; a sensing circuit including a thermosensitive
element responsive to a temperature of the measurement
object; and a transmitter for transmitting, as the
temperature information, an output of said sensing circuit
through said coil when the identification information stored
in said memory is specified by said data collector, and

said data collector is provided with an energy source
25 for generating electromagnetic energy; a transmitter for
transmitting identification information to specify an
arbitrary one of said spherical semiconductors; and a
receiver for detecting the temperature information
transmitted from the specified spherical semiconductor.

30 2. The non-contact temperature measuring apparatus
according to claim 1, wherein said coil and said
thermosensitive element mounted on said each spherical
semiconductor are disposed diametrically opposite to each

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other.

3. The non-contact temperature measuring apparatus according to claim 1, wherein the measurement object is a semiconductor wafer, and

5 said thermosensitive element is embedded into a surface layer of the semiconductor wafer.

4. The non-contact temperature measuring apparatus according to claim 1, wherein said memory of said each spherical semiconductor is a nonvolatile memory that retains
10 the identification information even when the internal power disappears.

5. A non-contact temperature measuring method, comprising the steps of:

(a) substantially uniformly distributing the spherical semiconductors of the non-contact temperature measuring apparatus as set forth in any one of claims 1-4 on a measurement object;

(b) simultaneously supplying the spherical semiconductors with electric power from the data collector of said apparatus, to thereby permit the spherical
20 semiconductors to detect temperatures of different points on the measurement object;

(c) contactlessly collecting, by the data collector, pieces of temperature information indicative of the detected
25 temperatures and transmitted from the spherical semiconductors; and

(d) determining temperatures of or a temperature distribution throughout the measurement object based on the pieces of temperature information by the data collector.

30 6. The non-contact temperature measuring method according to claim 5, wherein said step (a) includes disposing one of the spherical semiconductors at a center of a surface of a semiconductor wafer serving as the measurement

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object and disposing remaining spherical semiconductors at equal angular intervals on a circumference of at least one imaginary circle centered at the center of the surface of the semiconductor wafer, and

5 said step (b) includes detecting surface temperatures of different points on the semiconductor wafer.

7. The non-contact temperature measuring method according to claim 5, wherein said step (c) includes sequentially collecting pieces of identification information
10 which are proper to the spherical semiconductors, respectively, and each of which is transmitted from a corresponding one of the spherical semiconductors together with the temperature information, and

 said step (d) includes determining the temperature distribution throughout the measurement object in accordance with the pieces of temperature information and the pieces of identification information.

8. The non-contact temperature measuring method according to claim 5, wherein said step (c) includes correcting the temperature information to be transmitted from each spherical semiconductor in accordance with temperature correction information determined for each spherical semiconductor, the temperature correction information being determined from the output of the sensing circuit of the
25 spherical semiconductor in a condition that the measurement object mounted with the spherical semiconductors is placed in a predetermined temperature circumstance.